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The Army Meter Data Management System (MDMS)

A Case Study
For Army MDMS Pilot

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MDMS Serves the Army in Meeting Energy Goals

- MDMS will help the Army to comply with Federal Mandates
  - Energy Policy Act of 2005 (EPAct 2005)
  - Energy Independence and Security Act of 2007 (EISA 2007)
  - Other Executive Orders
  - Army Programs Like Net Zero and LEED Silver

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What is MDMS?

- An enterprise system to track the Army's energy and water consumption worldwide
  - Tracks meter data from advanced utility meters in a central database (MDMS Enterprise)
  - Automates meter data collection on a secure network
  - Produces energy reports accessible via Army Engineering Knowledge Online (EKO) and MDMS Enterprise Portal
- Provides Army installations the ability to track utility commodities consumption at the facility level

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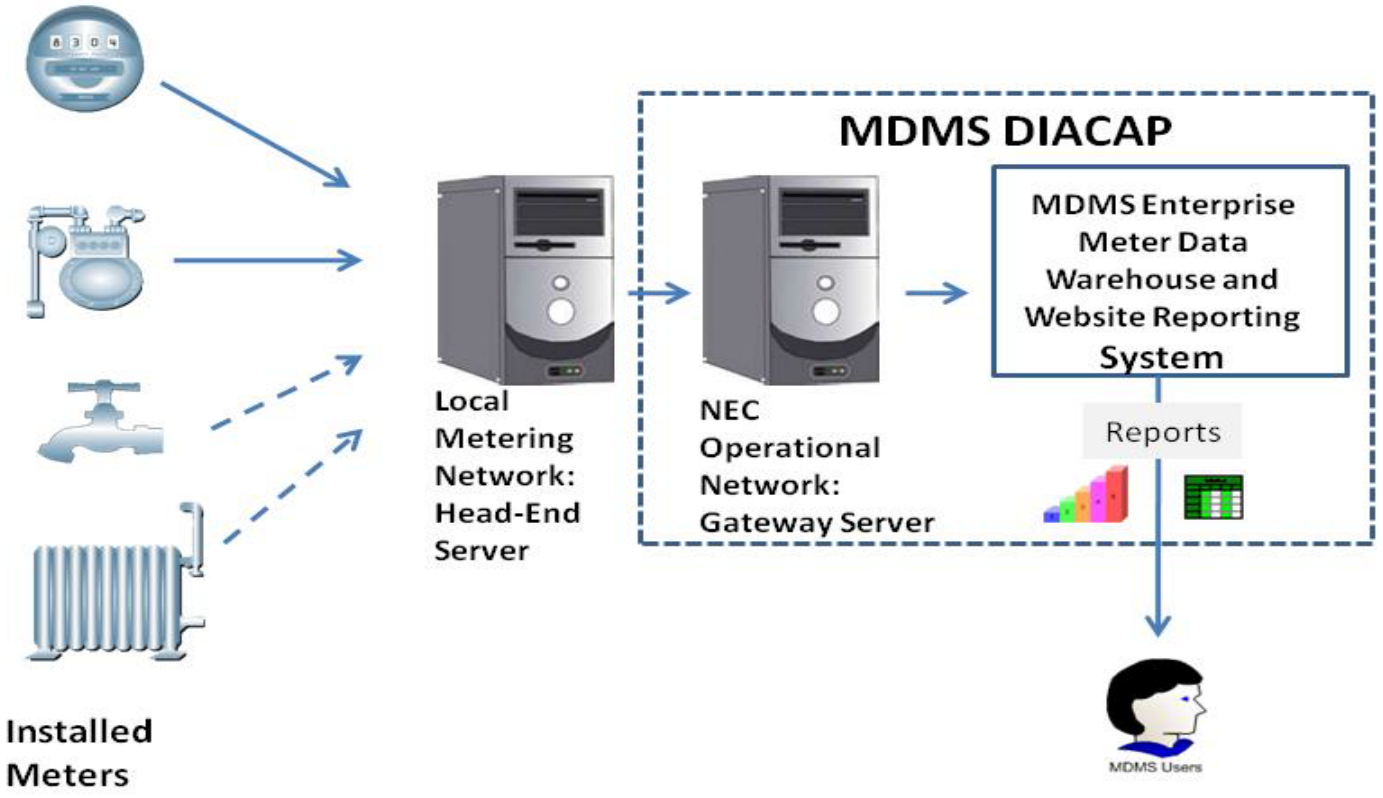
What is being installed?

- Meter Data Management System (MDMS)
  - Gateway communicates to the head end server



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MDMS Background

- Three locations have active meter reporting- over 195 meters as of 1 May 2011
  - Fort Carson
  - Fort Stewart
  - US Military Academy (West Point, NY)
- Meets DoD cyber-security requirements
  - Received Authority to Operate from Army NETCOM effective 23 April 2010
  - Received Certificate of Networthiness from Army NETCOM on 26 July 2010
- Over 195 meters reporting at 3 sites (05/01/11)

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System Default View

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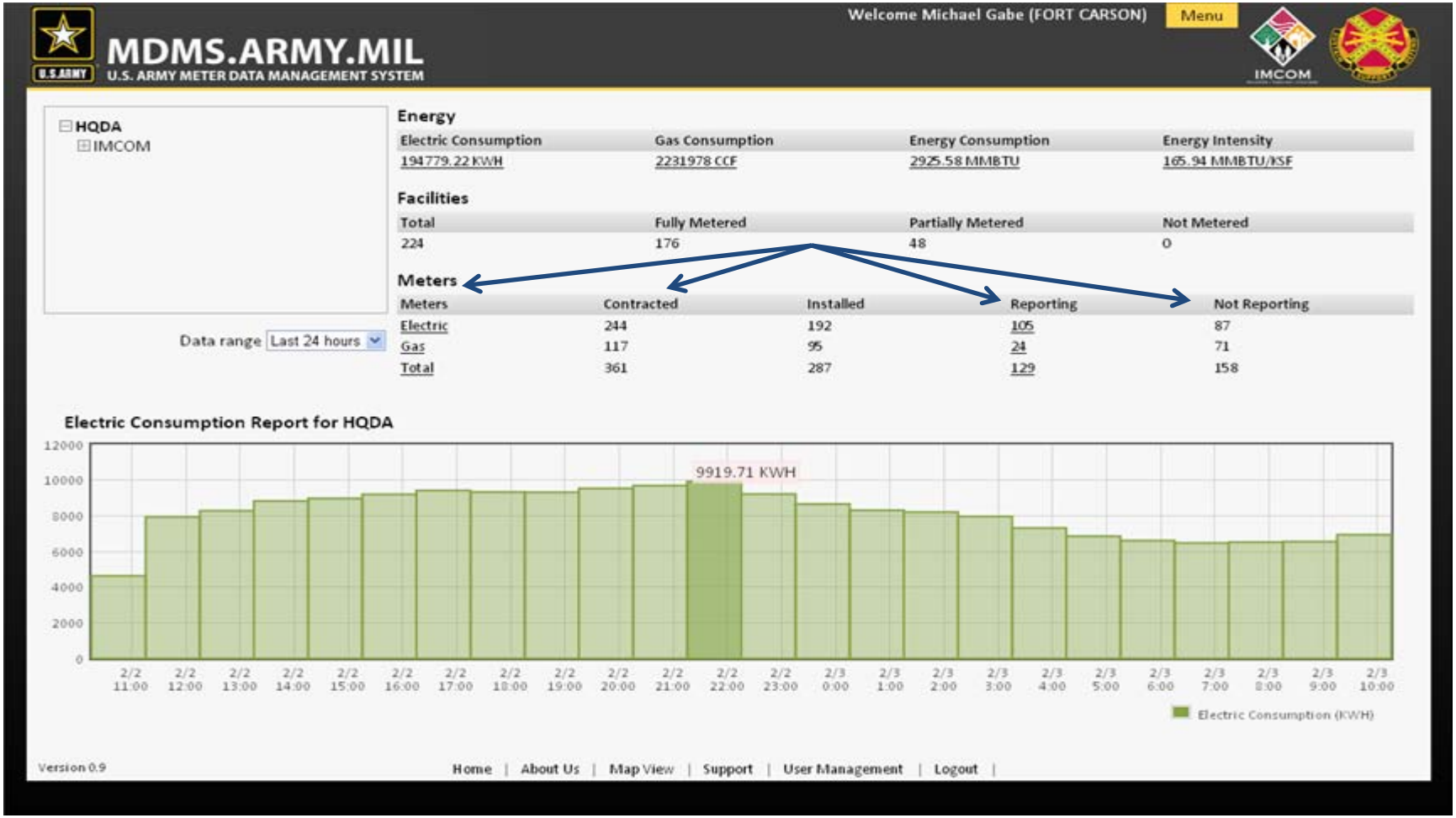
System Output, Meter Status



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MDMS
Results of Pilot

- Authority to Operate on DoD network
  - Received ATO from Army NETCOM effective 23 April 2010
  - Received CoN from Army NETCOM on 26 July 2010

- Over 195 meters reporting at 3 sites (05/01/11)
  - 16 Electric , 0 NG Fort Stewart
  - 73 Electric, 18 NG Fort Carson
  - 56 Electric, 32 NG West Point

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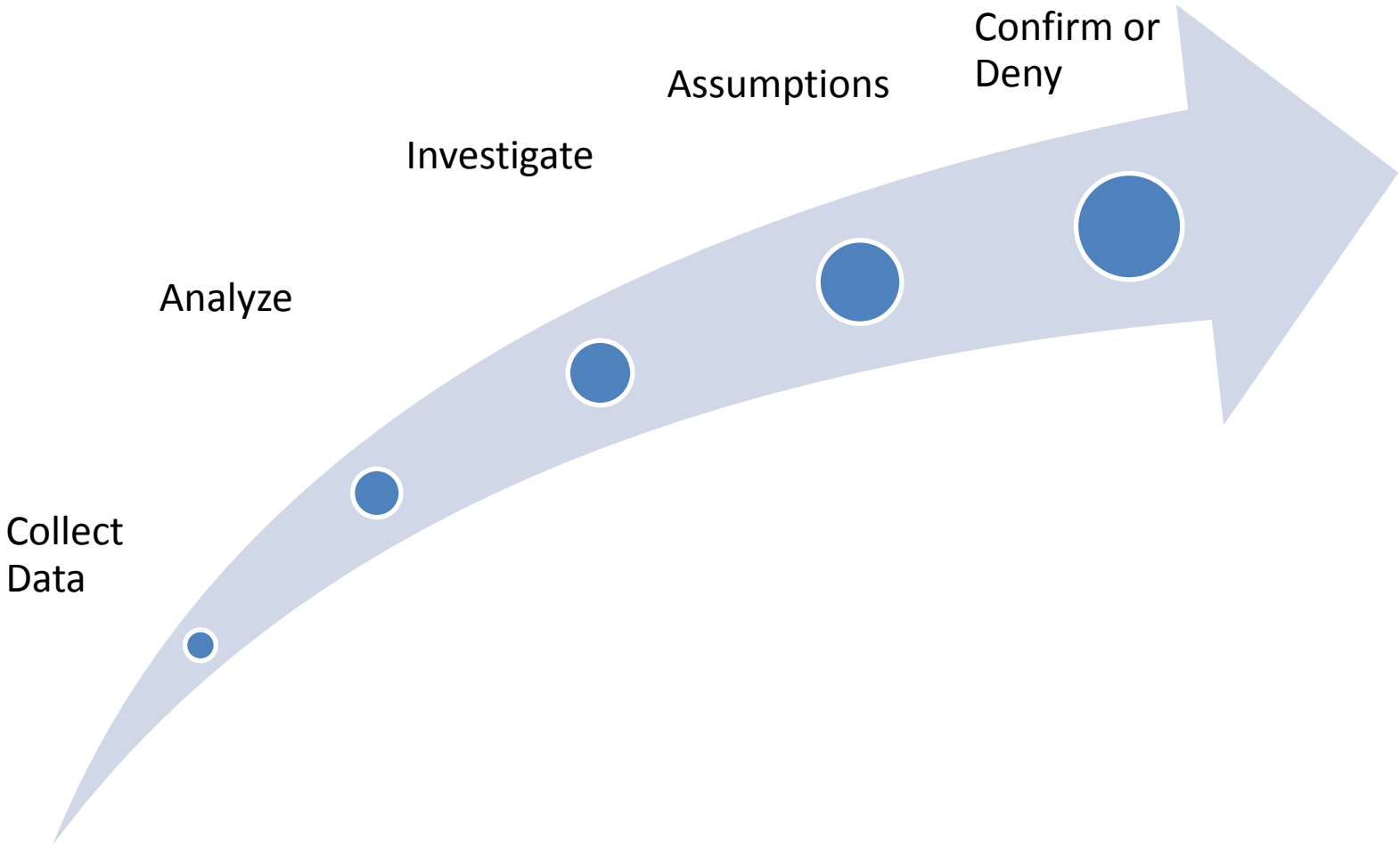
MDMS Process



Case Study (Typical)

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Case Study

The MDMS collected meter data from a single building.

The data collected:

15-minute incremental electric (kWh) consumption data
672 discrete data elements (every 15 minutes for 7 days)
One full week (Sunday to Saturday)
August 1 through August 7, 2010

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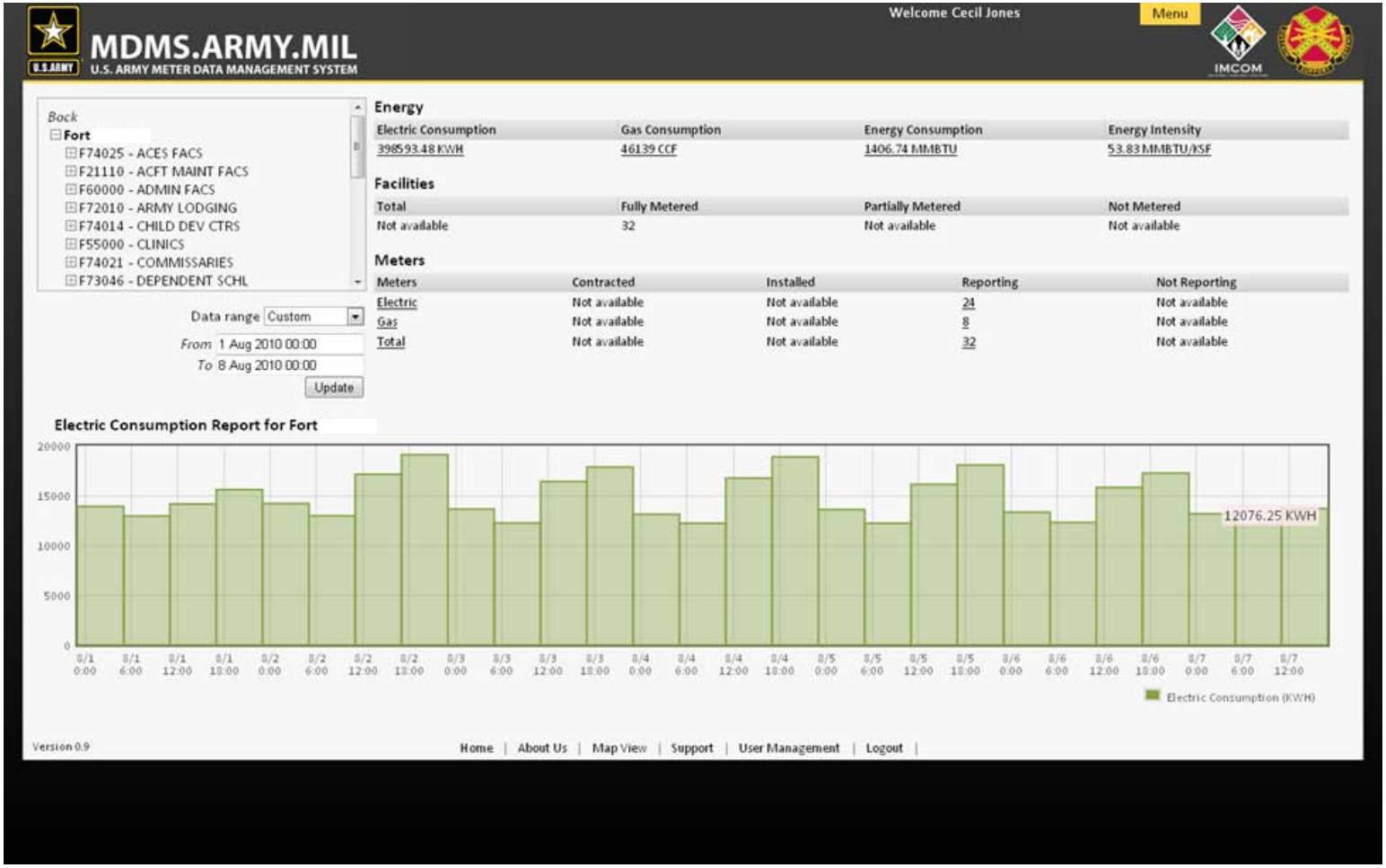
Initial Data from MDMS



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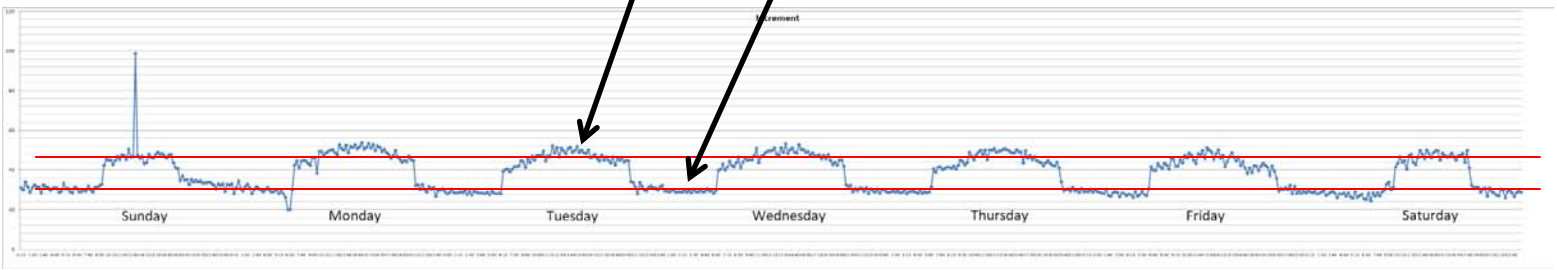
Demand Analysis

Consistent levels of consumption, day and night



Daytime average of 50 kWh every 15 minutes ≈200kW
Nighttime average of 30 kWh every 15 minutes ≈120kW
Δ is ≈80kW

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Clue: The Energy Delta

80	kW delta
80	hours/wk
52	weeks/year
332,800	kWh per year
61,595	SF
5.40	kWh/SF/year

5.4 kWh/SF/year is approximately half a typical lighting load, but typical if one third to half of the total SF is storage…

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Energy Conservation Measures

Based on MDMS data and analysis, this facility is a potential candidate for:

- Daylight harvesting
- Lighting automation
- Nighttime setbacks of other building systems, particularly air handling units (AHUs)

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Confirmation

During a site visit, we were able to confirm:

- The facility is not connected to the energy management system (neither heating or air conditioning systems are being set back at night);
- Lighting is manually controlled and is turned on at the beginning of the shift and off at the end of the shift; and
- The building is a single story, flat-roof building: ideal for solar and daylight harvesting.

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Solar and Daylight Harvesting (Typical Project)

kWh per year for lighting						
	Reduction Percentages for Various Light Harvesting Projects					
Based on 332,800 kWh per year total for lighting	20%	30%	40%	50%	60%	70%
Annual kWh Savings	66,560	99,840	133,120	166,400	199,680	232,960
Approximate Square Feet of Solar Panels offset*	1,481	2,222	2,963	3,704	4,444	5,185

*Kyocera multi-crystalline 120w panels @ 12W/SF max and 90% grid tie conversion efficiency

Solar Panel Calculation	120	watt panel
X	80	hours per week
X	52	weeks
Equals	499.2	kWh per year gross
X .90	449.28	kWh per year net
Per	10	SF per panel
Potential Harvest	44.928	kWh per year per SF

MDMS
Plans for Rollout

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MDMS Plans

- Roll out to 40 additional installations and update current 3 by 1 October 2011
- Upgrade interoperability to allow for additional data point capture
- Integrate real property data
- Support tenant billing
- Establish help desk and training
- Upgrade reporting module to include more functionality and report flexibility
- Support Army Net Zero goals

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The Army path to Net Zero Energy

1. Reduce consumption
2. Repurpose inefficient usage
3. Deploy renewable on site generation

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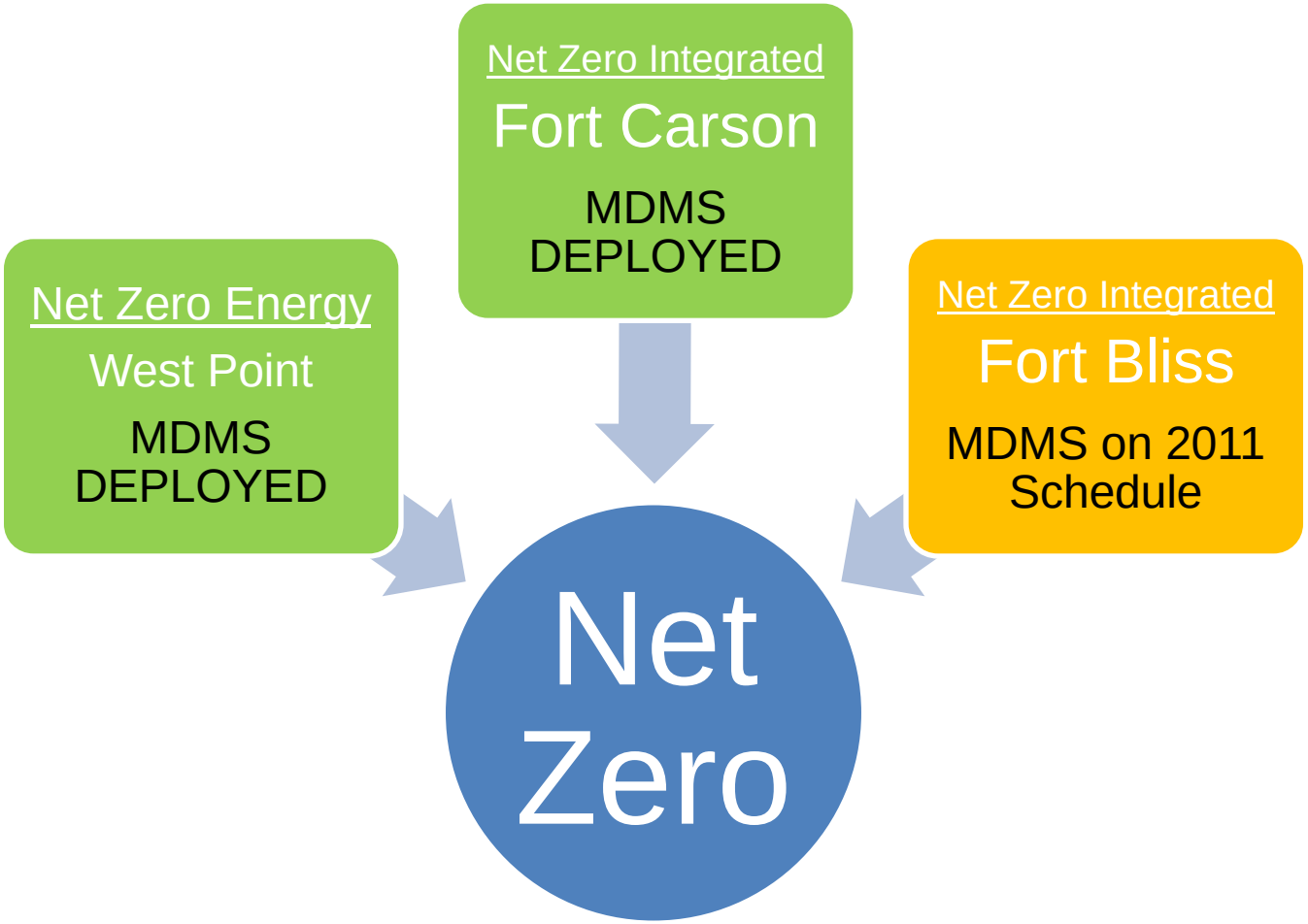
Leverage MDMS at Existing Sites



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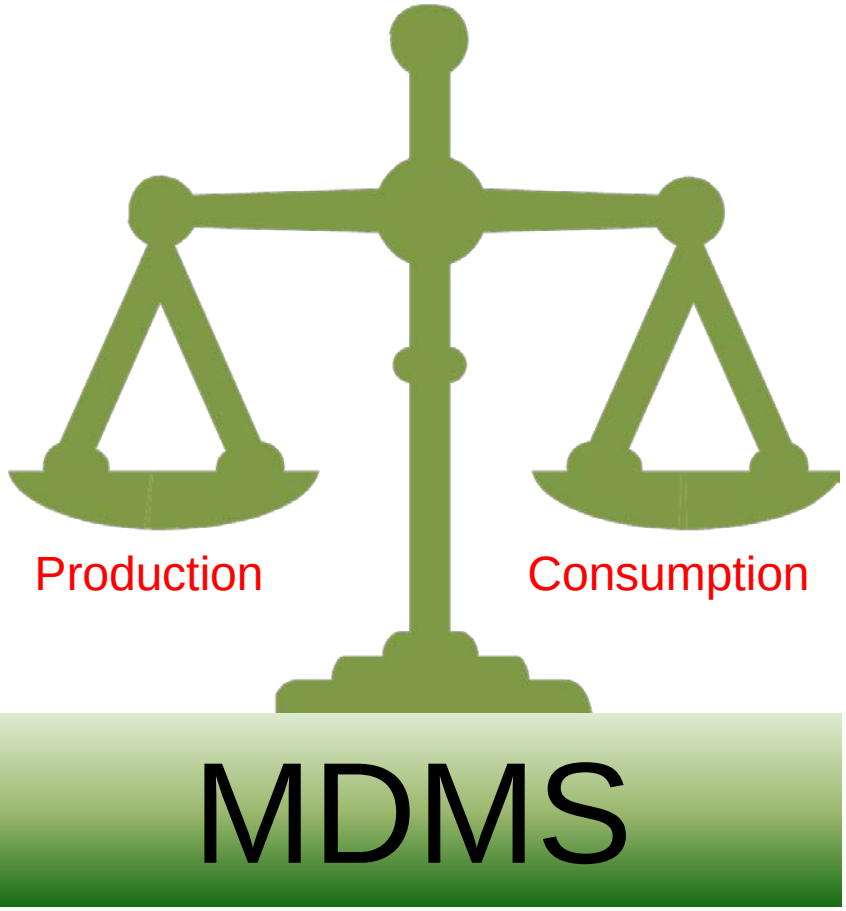
Visualize Net Zero Balance



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MDMS
Roll-out Challenges

- DIACAP/ATO
  - Must have top level buy-in and agreements
  - UMCS and Meter networks offer a new challenge
- Interoperability with meters/head-end servers
  - Variability in equipment, software, configurations and installers
- Sustainability planning
  - “After the contract period ends, who will maintain software, servers, and other equipment?”

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